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APPLICATION NO.	FIL	ING DATE	FIRST NAMED INVENTED	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/779,287	02	2/08/2001	George Ernest Morris	37,248-04	6598
4249	7590	10/15/2003		EXAMINER	
CAROL V	VILSON		GRIFFIN, WALTER DEAN		
BP AMERI MAIL COI			ART UNIT	PAPER NUMBER	
4101 WINI		D	1764		
WARREN	VILLE, IL	60555	DATE MAILED: 10/15/2003		

Please find below and/or attached an Office communication concerning this application or proceeding.

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•		App	olication No.		Applicant(s)
		09/	779,287		MORRIS ET AL.
	Office Action Summary	Exa	miner		Art Unit
	·	Wa	lter D. Griffin		1764
Period fo	The MAILING DATE of this comn r Reply	nunication appears	on the cove	sheet with the c	orrespondence address
THE I - Exter after - If the - If NO - Failu - Any r	ORTENED STATUTORY PERIOD MAILING DATE OF THIS COMMUSIONS of time may be available under the provisions of time may be available under the provisions of time may be available under the provision of reply specified above is less than this period for reply is specified above, the maximuse to reply within the set or extended period for reply received by the Office later than three mond patent term adjustment. See 37 CFR 1.704(b)	UNICATION. sions of 37 CFR 1.136(a). communication. ty (30) days, a reply within m statutory period will appi reply will, by statute, cause ths after the mailing date o	In no event, howe the statutory min by and will expire the application t	ever, may a reply be tim imum of thirty (30) days SIX (6) MONTHS from b become ABANDONEI	nely filed s will be considered timely. the mailing date of this communication. O (35 U.S.C. § 133).
1)🛛	Responsive to communication(s	s) filed on <u>05 Augus</u>	st 2003 .		•
2a)⊠	This action is FINAL.	2b)☐ This ac	tion is non-fi	nal.	
3)□ Dispositi	Since this application is in condi closed in accordance with the p on of Claims				
4)🖾	Claim(s) 1-21 is/are pending in t	he application.		•	
	4a) Of the above claim(s) i	is/are withdrawn fro	om consider	ation.	
5)	Claim(s) is/are allowed.				
6)⊠	Claim(s) <u>1-21</u> is/are rejected.		-		
7)	Claim(s) is/are objected to) .			
•	Claim(s) are subject to res	striction and/or elec	ction require	ment.	
9) 🗌 .	The specification is objected to by	the Examiner.			
10) 🔲 .	The drawing(s) filed on is/a	are: a)⊟ accepted o	r b) 🔲 object	ed to by the Exar	miner.
	Applicant may not request that any	objection to the draw	wing(s) be he	d in abeyance. So	ee 37 CFR 1.85(a).
11) 🔲 🤈	The proposed drawing correction	filed on is: a	a) approv	ed b) disappro	ved by the Examiner.
	If approved, corrected drawings are	e required in reply to	this Office ac	tion.	
12) 🔲	The oath or declaration is objected	d to by the Examin	er.		
Priority u	ınder 35 U.S.C. §§ 119 and 120				
13)	Acknowledgment is made of a cl	aim for foreign prio	rity under 3	5 U.S.C. § 119(a)-(d) or (f).
a)[☐ All b)☐ Some * c)☐ None o	of:			•
	1. Certified copies of the prio	rity documents hav	e been rece	eived.	
	2. Certified copies of the prio	rity documents hav	e been rece	eived in Applicati	on No
. * \$	3. Copies of the certified copies application from the Interest the attached detailed Office a	ternational Bureau	(PCT Rule	17.2(a)).	-
14) 🗌 A	cknowledgment is made of a clai	m for domestic pric	ority under 3	5 U.S.C. § 119(e	e) (to a provisional application
) ☐ The translation of the foreign Acknowledgment is made of a clai				
Attachmen	(s)	•			
2) Notic	e of References Cited (PTO-892) e of Draftsperson's Patent Drawing Revie nation Disclosure Statement(s) (PTO-144	·	4) 5) 6)		(PTO-413) Paper No(s) Patent Application (PTO-152)
I.S. Patent and To PTOL-326 (R		Office Action S	Summary		Part of Paper No. 14

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DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

- 1. Determining the scope and contents of the prior art.
- 2. Ascertaining the differences between the prior art and the claims at issue.
- 3. Resolving the level of ordinary skill in the pertinent art.
- 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatanaka et al. (6,217,748) in view of EP 0482841 A1, and Ford et al. (3,341,448).

The Hatanaka reference discloses a process in which a sulfur-containing gas oil is hydrotreated to remove sulfur compounds. This gas oil would necessarily have an API gravity within the claimed range. This hydrotreating is conducted in the presence of a hydrotreating

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catalyst. The resulting hydrotreated feed is separated into a light fraction and a heavy fraction. The cut point temperature for separation of the fractions is in the range of 300 to 350°C. The light fraction is essentially free of sulfur whereas the heavy fraction must be further desulfurized to remove, for example, dibenzothiophene compounds. Following this further desulfurization, the light and heavy fraction are blended to produce a fuel. See col. 2, lines 65-67; col. 3, lines 1-11 and 26-56; col. 4, lines 11-67; col. 5, lines 1-23 and 65-67; and col. 6, lines 1-10.

The Hatanaka reference does not disclose desulfurization of the heavy fraction by contacting it with a quaternary ammonium salt, hydrogen peroxide, and acid.

The EP 0482841 A1 reference discloses a process for desulfurizing a hydrocarbon oil such as a diesel by combining the oil with an aqueous solution of an oxidant such as hydrogen peroxide and catalyst and oxidizing the sulfur in the oil. The catalyst can be a phosphotungstic acid. A phase transfer agent such as a quaternary ammonium salt can be included in the solution. The oxidized sulfur is then separated from the oil. The separation can be performed by contacting the oil with a solvent (e.g., C₁-C₄ alcohols) to extract the oxidized sulfur or by contacting the oil with an adsorbent such as silica. See page 2, line 26 through page 3, line 13 and the examples.

The Ford reference discloses that the degree of desulfurization achieved by successive oxidative and hydrodesulfurization stages is significantly higher than that achieved by either two successive oxidative desulfurization stages or two successive hydrodesulfurization stages and that the improvement is independent of the order of the stages. See col. 3, lines 13-30.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Hatanaka by substituting the desulfurization

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process of EP 0482841 A1 for the second desulfurization of Hatanaka because the desulfurization of EP 0482841 A1 is effective for removing sulfur compounds removed by the second desulfurization of Hatanaka. Additionally, as disclosed by Ford, combining the first hydrodesulfurization of Hatanaka with the oxidative desulfurization of EP 0482841 A1 would result in the expectation that a significantly higher degree of desulfurization would be achieved than is achieved by the two successive hydrodesulfurization stages disclosed by Hatanaka.

Regarding the claimed quaternary ammonium salt, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the references by utilizing the claimed quaternary ammonium salts because these salts are chemically similar to the disclosed salts and therefore would be expected to be effective in the claimed process.

Regarding the recycle of the aqueous phase, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the references by recycling the aqueous phase because material costs will be reduced by recycling thereby improving the economics of the process.

Regarding the presence of nitrogen in the feed, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the references by utilizing a feed that also contains nitrogen compounds because one would expect the sulfur compounds to be effectively oxidized regardless of the presence of nitrogen.

Additionally, combining the disclosed separation methods of solvent extraction and adsorption would have been obvious to one having ordinary skill in the art because combining

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two known separation methods would result in the expectation of the recovery of a purer product.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hatanaka et al. (6,217,748), EP 0482841 A1, and Ford et al. (3,341,448) as applied to claim 17 above, and further in view of Takacs (US 3,909,395).

None of the previously discussed references discloses the treatment with a carbonate or bicarbonate solution.

The Takacs reference discloses that oxidized hydrocarbon streams are washed with a carbonate solution to obtain a treated stream that contains a reduced amount of oxidized sulfur compounds. See column 3, lines 8-12.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the previously discussed references by washing the treated liquid with a carbonate solution as suggested by Takacs because the treated liquid will have a reduced amount of sulfur compounds.

Response to Arguments

The argument that the claimed process produces products having unexpectedly low levels of sulfur and nitrogen is not persuasive because the combination of the refining steps of the applied prior art would result in the expectation of a product having a sulfur content lower than that of a product treated only by one of the refining steps.

The argument that the Takacs reference's teaching of washing with a carbonate solution is not useful to treat a petroleum derived mixture is not persuasive because the teachings of the

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reference are applicable to a number of compositions including gasoline. The treatment of the pine oil in the example cannot be interpreted to mean that the treatment is not useful for a petroleum mixture.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter D. Griffin whose telephone number is 703-305-3774. The examiner can normally be reached on Monday-Friday 6:30 to 4:00 with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 703-308-6824. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0651.

Walter D. Griffin Primary Examiner Art Unit 1764

WG October 10, 2003